What is claimed is:

1. A method by steps comprising comparing electronically a reflected light intensity transition region with a predetermined reflected light intensity transition region threshold to determine compliance of a component.

2. The method of claim 1, in which the component is connected to a printed circuit board assembly, and in which the reflected light intensity transition region is an intensity of light reflected off a meniscus of a solder joint formed between the component and an associated solder pad of the printed circuit board assembly, wherein the steps further comprising:

ascertaining a status of the component at a predetermined component site of the printed circuit board assembly;

characterizing adherence of the intensity of light reflected off the meniscus to the predetermined light intensity transition region threshold; and

determining compliance of the component connected to the printed circuit board assembly based on the characterization of the adherence of the intensity of light reflected off the meniscus to the threshold.

3. The method of claim 2, in which the status of the component at the predetermined component site of the printed circuit board assembly is a presence status, wherein the method proceeds to the characterizing step when the component present substantially conforms to a predetermined component footprint.

4. The method of claim 3, in which the step of characterizing adherence of the intensity of light reflected off the meniscus to the threshold comprises:

associating a solder pad search window to the predetermined component footprint;

identifying a leading edge of the meniscus of the solder joint within the solder pad search window;

isolating a trailing edge of the meniscus of the solder joint;

determining the intensity of light reflected off the meniscus is a shadow projection of the meniscus of the solder joint based on a relationship

between the leading and trailing edges of the meniscus of the solder joint; and

comparing the shadow projection with the predetermined reflected light intensity transition region threshold to characterize the meniscus of the solder joint, wherein the predetermined reflected light intensity transition region threshold is a predetermined shadow projection threshold.

5. The method of claim 4, in which the predetermined shadow projection threshold is a minimum shadow width, wherein the shadow projection exceeds the minimum shadow width, and in which the determining step determines the component is compliant based on the shadow projection exceeding the minimum shadow width.

6. The method of claim 4, in which the predetermined shadow projection threshold is a minimum shadow width, wherein the shadow projection fails to exceed the minimum shadow width, and in which the determining step determines the component is non-compliant based on the shadow projection failing to exceed the minimum shadow width.

7. The method of claim 2, in which the status of the component at the predetermined component site of the printed circuit board assembly is a presence status, wherein the method proceeds to the determining step when the component present fails to substantially conform with a predetermined component footprint, wherein the determining step determines the component to be non-compliant and identifies the printed circuit board assembly as a non-compliant printed circuit board assembly.

8. The method of claim 2, in which the status of the component at the predetermined component site of the printed circuit board assembly is a non-presence status, wherein the determining step determines the non-presence status of the component to be compliant and identifies the printed circuit board assembly as a compliant printed circuit board assembly.

9. The method of claim 2, in which the status of the component at the predetermined component site of the printed circuit board assembly is a non-presence status, wherein the determining step determines the non-presence status of the component to be non-compliant and identifies the printed circuit board assembly as a non-compliant printed circuit board assembly.

10. The method of claim 3, in which the meniscus of the solder joint is characterized as missing by the characterizing step, and in which the determination step determines the missing meniscus to be a non-compliant component and identifies the printed circuit board assembly as a non-compliant printed circuit board assembly.

11. The method of claim 4, in which the leading edge of the meniscus of the solder joint is identified by steps comprising:

illuminating the printed circuit board assembly with a light source;

focusing a vision system across the solder pad search window;

measuring a brightness intensity level of a reflected light reflected off the solder pad from the light source;

determining a brightness intensity level of the reflected light reflected off the meniscus of the solder joint from the light source; and

analyzing the brightness intensity level of the light reflected off the meniscus of the solder joint relative to the brightness intensity level of the light reflected off the solder pad to ascertain the leading edge of the meniscus of the solder joint.

12. The method of claim 11, in which the brightness intensity level of the light reflected off the meniscus of the solder joint is less than the brightness intensity level of the light reflected off the solder pad.

13. The method of claim 12, in which the measured brightness intensity level of the light reflected off the solder pad is greater than a predetermined brightness intensity level threshold.

14. The method of claim 13, in which the measured brightness intensity level of the light reflected off the meniscus of the solder joint is less than the predetermined brightness intensity level threshold.

15. The method of claim 11, in which the solder pad has a substantially flat surface, the vision system includes a lens with a flat surface and a curved surface, wherein the curved surface includes a center of curvature, and wherein a line normal to the flat surface of the lens and passing through the center of curvature of the lens is substantially parallel with an angle of incidence of the light reflected from the substantially flat surface of the solder pad.

16. The method of claim 15, in which the component has a substantially flat surface, wherein the line normal to the flat surface of the lens and passing through the center of curvature of the lens is substantially parallel with an angle of incidence of the light reflected from the substantially flat surface of the component.

17. The method of claim 16, in which the meniscus of the solder joint has a substantially curved surface, wherein the line normal to the flat surface of the lens and passing through the center of curvature of the lens is substantially non-parallel with an angle of incidence of the light reflected from the substantially curved surface of the meniscus of the solder joint.

18. The method of claim 17, in which the substantially non-parallel angle of incidence of the light reflected off the meniscus of the solder joint relative to the line contrasted with, the substantially parallel angle of incidence of the light reflected off the solder pad and the component relative to the line provides the shadow projection.

19. The method of claim 5, in which the determining step determines the printed circuit board assembly as a compliant printed circuit board assembly based on the determination that the component is compliant.

20. The method of claim 6, in which the determining step determines the printed circuit board assembly as a non-compliant printed circuit board assembly based on the determination that the component is non-compliant.

21. An apparatus for determining compliance of a printed circuit board assembly based on compliance of a component connected to the printed circuit board assembly by a solder joint comprising:

a light source illuminating the component of the printed circuit board assembly as well as the solder joint connecting the component to the printed circuit board assembly;

a processor controlled vision system responsive to the light source;

an alignment apparatus controlled by a processor supporting the vision system, the alignment apparatus aligning the vision system relative to the solder joint and the component; and

decision software programmed into the processor responsive to the vision system determining compliance of the component connected to the printed circuit board assembly based on a shadow projection of the solder joint to determine compliance of the printed circuit board assembly.

22. A data storage device comprising:

a head-disc assembly; and

a compliant printed circuit board assembly attached to the head-disc assembly, compliance of the printed circuit board assembly determined by means for determining compliance of a printed circuit board assembly through steps for determining compliance of a component connected to a printed circuit board assembly.

23. The data storage device of claim 22, in which the means for determining compliance of a printed circuit board assembly comprises:

a light source illuminating the component of the printed circuit board assembly as well as the solder joint connecting the component to the printed circuit board assembly;

a processor controlled vision system responsive to the light source;

an alignment apparatus controlled by a processor supporting the vision system, the alignment apparatus aligning the vision system relative to the solder joint and the component; and

decision software programmed into the processor responsive to the vision system determining compliance of the component connected to the printed circuit board assembly based on a shadow projection of the solder joint to determine compliance of the printed circuit board assembly.

24. The data storage device of claim 22, in which the steps for determining compliance of a component connected to a printed circuit board assembly comprise:

ascertaining a status of the component at a predetermined component site of the printed circuit board assembly;

comparing electronically a reflected light intensity transition region with a predetermined reflected light intensity transition region threshold, wherein the reflected light intensity transition region is an intensity of light reflected off a meniscus of a solder joint

formed between the component and an associated solder pad of the printed circuit board assembly;

characterizing adherence of the intensity of light reflected off the meniscus to the threshold; and

determining compliance of the component connected to the printed circuit board assembly based on the characterization of the adherence of the intensity of light reflected off the meniscus to the threshold.